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NEW RIG

FOR

SHIPS AND OTHER VESSELS,

COMBINING

ECONOMY, SAFETY, AND CONVENIENCE.

BY R. B. FORBES.

Third Edition, enlarged.

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THE BUSINESS HISTORICAL
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PREFACE TO THE THIRD EDITION.

THE experience of the "New Rig," during the last six years, in the ships Massachusetts, Samoset, Reindeer, and in the barks Edith, Lantao, Racehorse, and Mermaid, satisfies me that it must come into general use in the merchant-service; and I beg most earnestly to call the attention of ship-owners and shipmasters to the many advantages set forth in the following pages, all of which have been fully realized by those who have sailed in the ships alluded to.

I have invariably endeavored to ascertain from those who have commanded ships in which I had an interest, whether any objections in practice have been found to the new rig, and have the pleasure to say that no alterations have been suggested, and that those who commenced voyages with prejudices have returned fully convinced that the new rig is better and cheaper than the old; and I would call the attention of the reader to the opinion of Capt. Louis M. Goldsborough, as stated in the following letter: —

"Portsmouth, N. H., July 25th, 1851.

"R. B. Forbes, Esq.

"My Dear Sir:

"Within the last three years, it has been my lot to pass some fifteen months on board the 'Massachusetts,' which ship, it is quite generally known, was not only built under your own supervision, but also rigged, throughout, after your own original design, now recognised as 'Forbes' new rig.'

"Our public duties in that vessel involved a protracted sea-service, in the course of which ample opportunity was afforded me of witnessing the effects of her peculiar rig under a variety of circumstances, and of forming my own conclusions as to its real merits. These, in my judgment, are very decided, and carry with them advantages affecting economy, safety, and convenience, which cannot be too strongly impressed upon the minds of Ship-owners, and all others in any way concerned in commerce or navigation. Among the advantages which the 'new rig' possesses over the old, the following may be enumerated:

"The ordinary number of men allotted as the crew, may be reduced without compromitting either efficiency or safety.

"Spars are less liable to be carried away, and sails to be worn out in calms, or split or lost in heavy weather, owing to the great facility of management which the rig itself especially confers.

"A more general interchange of spars and sails, fore and aft the Ship, than is effected by any other mode of rig.

"Much flatter surfaces of sails, and hence a material benefit in bowline sailing.

"Less *leverage weight* aloft (regarding the point of support to lie in the plane of floatation), and thus a less tendency to interfere with stability, or to cause the ship to incline. The eye itself may induce an opposite impression; but if one will take into consideration the materially reduced size of topmasts, actual position of yards when all the canvas is spread, quality of canvas, distribution of heavy blocks, &c. &c., the error of such impression will soon be made manifest. This, too, may be easily confirmed by quite an elementary calculation.

"In the emergency of reefing down, even to double-reef topsails, when the ship is in a *tight* place, the advantages of this rig are very conspicuous; for it may be done *without losing the command or steerage-way of the Ship in the slightest degree*, and with the greatest facility. In the event of a squall, too, all that is necessary to bring the vessel, as it were, under double-reef topsails, is simply to let go the topgallant hailyards; for then, the topgallant sheets being kept fast, the sails, assimilating as they do to those of a polacre, will take very good care of themselves, provided only that braces and buntlines be looked after.

"Its applicability to sea-propellers is another point worthy of especial notice. In such vessels, striking topmasts, and sending down all the yards fore and aft, must be of frequent occurrence. The topmasts being abaft, of comparatively light weight, and not interfered with by the lower yards, the performance of the task is thereby very much facilitated.

"Also, for men-of-war of a large class — line-of-battle ships — manifold reasons may be assigned why it should be preferred.

"While on the coast of California, we had occasion to go from San Francisco to the Sandwich Islands. This was done with but a boat's crew of men to handle the ship; and when about midway, the number of these men was reduced, by sickness, to four in a watch. Notwithstanding this circumstance, no one on board felt the slightest apprehension as to the safety of the Ship, nor was canvas spared her for a moment on that account. Had she been of the old rig, we should have felt our situation very differently.

"In conclusion, I beg to assure you that so far as I ever exchanged opinions with the officers of the 'Massachusetts' in relation to her rig, every one of them was literally delighted with its convenience and efficiency. Indeed, I have not yet met the first person, whether in or out of the Navy, who has actually served in a vessel rigged after your fashion, at all disposed to dispute its advantages, or to do otherwise than commend them in the warmest terms.

"Very sincerely and truly yours,

"L. M. GOLDSBOROUGH,
"*Commander U. S. Navy.*"

After a great deal of consideration, I have not thought of any material changes to introduce.

The rig is specially adapted to steam-ships, and particularly with the masts fidded abaft; and I confidently recommend it to all who are interested in large propellers for ocean-service. The appearance of the new rig is the only thing which, in the least degree, renders it objectionable; but, in these days of active competition, this objection should not be permitted to outweigh its many advantages.

I understand that one large packet-ship out of New York, the Great Western, belonging to C. H. Marshall, Esq., has adopted the new rig with some modifications. I have not seen the plans, and therefore cannot pronounce whether these modifications are improvements or not. I understand that the topsail, or "lower topsail," as it is called by some, is of the size of the usual close-reefed topsail, instead of being, as in my plan, of the size of a double-reefed topsail.

Of one thing I am thoroughly convinced, — that the designer of the modifications alluded to, however great his experience may be, cannot have given more anxious thought than I have done to the subject of the proportions of the sails, and to their availability for several places in the same ship. I therefore venture the opinion, that the modifications introduced will not be adopted when the new rig becomes more fashionable.

Most of the remarks which follow have been extracted from a pamphlet published by me in 1849. I have endeavored to reduce the amount of matter in the present pamphlet to a readable length, though too much cannot be said in favor of the rig; and I recommend it particularly to those building large ships, for which class it is *more necessary* than for smaller vessels, though I would adopt it in *all vessels*, whether sailing vessels or steamers, large or small ships, for the Atlantic or for the Pacific and China Seas. I have introduced a sketch of a large propeller, or auxiliary steamer; but, in carrying out my plan in regular steamers, the sails being auxiliary, the proportions would necessarily be different, as well as the position of the masts.

I am quite satisfied that the principal reasons why the new rig has not been already more generally adopted are simply, *that it is new;* that ship-owners, not seamen, are unwilling to adopt any thing which appears to them to be an experiment, or which adds any thing to their labor, and to the first cost of their ship, however economical it may be in the long-run. Again, ship-builders, spar-makers, riggers, and blacksmiths are indisposed to recommend any thing out of the ordinary course. They consider the plans carried out in the last packet perfect, and they are unwilling to undertake any thing novel, unless it originate with themselves; and, even then, it is found extremely difficult to introduce any improvement. Prejudice, for a time, gets the better of reason ; but, in the end, "economy, safety, and convenience" will carry the day.

The new rig is no longer an experiment; it has been tried during six years; and I have yet to find the seaman who can point out any practical disadvantage.

I cannot derive any pecuniary advantage from the introduction of the new rig. On the contrary, I am willing to labor gratis for its introduction. Why? Because I believe it will materially lessen the anxiety of the captain, and the labor of officers and men; I believe it will materially lessen the chances of disaster, and thus save valuable lives; I believe it will benefit owners and underwriters; and I cannot but look forward, with some pride and satisfaction, to the time when my plan will be universally admitted to be cheaper, safer, and more convenient, and thus conduce to the great cause of humanity.

Prejudice is fast melting away. Not long since, a thousand happy contrivances, now generally adopted, were looked upon as of no value, or as actually dangerous. One man finds fault with a new steering apparatus, because it cannot withstand the shock of stranding; another condemns a life-preserver, because it may possibly be rendered useless by a rupture. All the elements of life, including meat and drink and clothing, are expected in any new contrivance, although the objector may have gone hungry and thirsty and naked all his life. Only a very few years since, such ships as the Surprise, Gamecock, Staghound, White Squall, and a host of other new clippers, would have been considered wholly unsafe and uninsurable. Now they command the highest rates of freight for the longest and most stormy voyages; and, if they all had the new rig, they ought to be insured cheaper than the old-fashioned "cotton boxes."

R. B. F.

Boston, July, 1851.

NEW RIG FOR SHIPS.

Various expedients have been resorted to for the purpose of lessening the labor of making and taking in sail, with the object of decreasing the risk, the wear and tear, and the labor to the sailor; many improvements have been adopted for making ships more durable, more economical, and more comfortable; great progress has been made within the last twenty-five or thirty years in these respects, especially in the merchant-ships of the United States, and particularly during the last three years.

Ships are now more easily managed by smaller crews than formerly. The adoption of chain-cables, looked upon at first with distrust, is universal; iron trusses, iron futtock shrouds, iron bands to yards, friction roller sheaves, patent steering gear, ventilators, and many smaller articles, have come into general use. The labor of fitting and working ships is much reduced. The rigger, with his mass of "puddings," "mousings," "catharpings," "bentick shrouds," "top-burtons," "rolling tackles," buoys and buoy-ropes, has been obliged to give way, in a great measure, to the blacksmith. Jack is almost ready to go to sea for the love of it; and insurance offices are only kept open for lounging places, where the newspapers and the gossip of the day may be indulged in, — the president and directors occasionally putting their hands into their pockets to pay for some old ship that should have been condemned befóre starting! Chronometers, barometers, and thermometers, have crowded out lunars, azimuths, and amplitudes. Heaving the lead has become a matter of tradition; the commander who makes the best passage is the best fellow, no matter what risks he runs; — the everlasting spirit of go-ahead-ism rules paramount. Seamen, however, have not improved, except in the important matter of temperance, in the same ratio that ships and their rigging have improved: I speak more specially of the Jacks. The old pig-tail Agamemnons, the sons of Trafalgar, and the younger sons of victory who sailed and fought with Bainbridge, Hull, and others of our own side of the Atlantic, — the old privateersmen, full of oaths, tobacco, and rum, — all are gone! And, in many respects, it is fortunate that we know them no more. But they had their uses; and, generally speaking, always, when sober and at sea, they were *sailors* of the first water, ready and expert to obey any orders against an enemy or against the elements. They were the men not to be ashamed of a reef taken in during the darkest squall; they could straighten out their twelve or fifteen fathoms of line, and melodiously sing the "marks" and "deeps;" they had a religious pride in saying, "Ay, ay, sir!" to every order, and generally in obeying any seamanlike demand. In short, half a dozen of them in a gale of wind were worth ten of the men now rating as seamen.

One great cause of this falling-off in the quality of marlinspike sailors is the discovery of gold in California. Another prominent cause is to be found in the greatly-increased competition among shipowners, whereby economy is necessarily the first object. It is becoming unfashionable to have ships come and go in what once was considered fine order. The freight-list is the great object. It is very seldom that the eye is gratified with a ship coming into port looking neat and trig about her spars and rigging. The booming gun, at departure and on arrival, is no longer heard. Everybody goes and comes back, no matter what part of the world he has been to, without causing any remark. The levelling power of steam has told the story of his ship's loading, her time of sailing, &c.; the profit, or more likely the loss, on the cargo, is already calculated; the arrival of the ship is a mere fact to hear all about in the news-room. No one asks or cares whether she looks well or ill: her sails may be clewed up, and left hanging for a week in such style as would make an old tar weep, or she may be as trig as any of the old Unions, Georges, Zephyrs, or Panthers; nobody cares. From my country residence, I daily see ships coming and going, — gallant ships, well commanded, well officered, and only pretty well manned; and many of them carry the spirit of economy so far that they do not show their national flag. Ships meet on the ocean now-a-days, and pass each other by, without showing buntin, or asking a question, unless it be about the price of cotton, or the value of freight. "What is your longitude?" "Are you in want of any thing?" "Pleasant passage to you," and "Report me, on arrival, all well," are expressions no longer known to the language. If a man ask the first question, he is considered a fool; he is lost, and don't know where he is! If the second, he would be considered even less wise, and entirely opposed to the owner's interest; and, as for reporting him, steam will do that long before he gets home. All these little nothings combine to depreciate the quality of the sailor; the inducements to commerce at home render the sailor's vocation less popular daily; discipline is no longer maintained as formerly, and we are getting slipshod. — But I am wandering away on the wrong tack, and must come back to my starting point, namely, the best mode of sparring and rigging ships. Like most inventors, I imagine I have hit on the best plan, combining economy *in the long-run*, safety *always*, and especially adapted to constant progress, with rather small crews.

In 1844 I rigged the bark Edith, and in 1845 the ship Massachusetts, after the plan as exhibited in the sketch in the frontispiece; excepting that, in those vessels, the masts were fidded abaft, for the convenience of housing, which, as steamships, they might now and then be obliged to do. Whether steamships or not, I consider the fidding abaft as an advantage; but, to please the eye, I rigged the Samoset in 1847, and the Reindeer in 1849, with their masts as in the sketch, though not exactly of the same dimensions. She was rigged specially for the Atlantic. The present sketch exhibits a ship of the same dimensions as the Samoset, rigged for the East India or Pacific trade.

The dimensions of the ship are: — Length on deck, 150 feet; extreme beam, 33; depth 21; tonnage, about 746; 14 inches dead-rise at half floor; small house on deck, joining a small half-poop; house forward for crew; including cook-houses and berths for two petty officers, or for cook and steward.

The dimensions of the spars are: —

MASTS.

		HEAD.	DIAMETER.	RAKE.
	Feet.	Feet.	Inches.	Per foot.
Main mast, above the main rail . .	58	21	27	1¼
„ topmast, or topgallant, of this rig	49	6	14	
„ topgallant or royal . . .	19		8½	
„ royal or skysail mast and pole .	23½			
Fore mast, above rail	54½	20	25	1
„ topmast, or topgallant, of this rig .	44	5¼	14	
„ topgallant or royal . . .	17		8	
„ royal or skysail mast and pole .	21			
Mizzen mast, above rail . . .	55½	17½	19	1¾
„ top, topgallant, &c. all in one .	58		10	

Spanker-boom 42, end 2; gaff 29½, end 3.

Bowsprit, outboard	30		28 at knight-heads.	

Jib-boom, inside cap, 16½; out, 21; flying, 12; end 3½; = 53. The diameter same as topmasts.

YARDS.

		END.	DIAMETER.
	Feet.	Feet.	Inches.
Main yard	71	4	17
„ topsail and fore yards	62½	4	16 and 15
„ topgallant and foretopsail and cross-jack	52	3½	12, 11, 10
„ royal, foretopgallant, and mizzen-topsail	41	2¼	10, 9, 8
„ skysail, foreroyal, and mizzen-topgallant	32½	2	8, 7, 7
Fore skysail and mizzen royal	26½	1½	6

It will be perceived by these dimensions, that the sails on the foremast, excepting the foresail, all fit on the main, one stage higher up; that is to say, the fore yard is the same, excepting a difference in diameter, as the maintopsail yard; the foretopsail yard is the same as the maintopgallant yard, excepting in diameter, and the same as the cross-jack yard, and so on; so that all the sails and yards are available in several places, excepting the mainyard, the fore skysail, and mizzen-royal yards, — the last two not fitting on the main, unless a main moonsail, or skysail of the old rig, be wanted. The foresail and mainsail are only available where they go in all vessels. The maintopsail, although not exactly a fit for a foresail, not having drop enough, and being cut with gores, will answer very well for a foresail on a pinch, being the same on the head as that sail. The spanker is fitted as usual, — either with standing gaff to brail in, or to hoist and lower, or both. The bowsprit is longer than usual; but the lower fore stay enters the leader, or B's, in about the same place as in the usual rig; the upper "or cap-stay" enters the leader near the cap, and on the latter a heavy canvas "inner jib" is set, and it is a very useful sail. The jib and flying-jib require no particular explanation, except to note the fact that, when carrying sail equal to courses, double-reefed topsails, jib and spanker, — the foretopgallant-sail being furled, the spar which I call topgallant mast, or the foretop mast of old rig, has little to support except the jib, and is not likely to be crippled by the strain of the double-reefed topsail as well as the jib, as in the old rig. For similar reasons the flying-jib can be carried longer than usual, without crippling the fore-royal mast, or topgallant mast of the old rig; the hoist being less, and the doublings more, in proportion than those of the old rig.

Each topsail, topgallantsail, and the main royal and foresail, have one reef; the mainsail only has two reefs. All these reefs are made, like the courses of a man-of-war, to tie to a "jack-stay," or rod of iron, fastened at a proper distance above the bending "jack-stay," or batten; both legs of the points, which are shorter than usual, hang forward of the sail; and, when the sail is reefed, the bight of the sail hangs loosely between the forward side of the yard and the sail. The only disadvantage, found by experience in the Samoset and Reindeer, being that the loose sail slats about a little, and requires stopping in the wake of the flemish horses to prevent chafing; otherwise the reefs are much snugger, more easily taken in, and the points never foul the sheets of the sails next above. The centre of the sail is adjusted, so that by hauling up a jigger, fast to a toggle at the bunt cloth, and on a line with the reef, the reef cannot but be about right at the centre; and thus the men at the earrings and on the yard can haul out and reef away, without delay, and irrespective of each other. This is a decided convenience, which every seaman can appreciate in a dark night, when, in the usual process, much time is lost in "lighting out to windward," and in vain endeavors to ascertain, on the lee yard-arm, whether "you are out to windward." These are minor advantages. The greater conveniences and advantages I will endeavor to specify.

In squally, variable weather, by clewing up topgallant sails, your ship is, *with the watch*, very quickly brought under sail equal to double-reefs of the old rig, and without losing time and progress by having to haul up the mainsail, which is generally necessary, to double-reef the maintopsail after it has been carried to the reefing point; and in which operation it is often necessary to "luff and touch her;" or, if going with the wind on the quarter, "yaw her off a little," or "brace the yards bye." Every seaman has experienced the labor, in very squally latitudes, of having to reef several times during the day or night; and many a one has kept his ship for hours under double reefs, when he would have been very glad to let them out, if sure he could get them in quickly, without calling all hands, and harrassing his crew by repeated calls. The sails can be carried longer and reduced quicker by the watch, than by all hands with the old rig; the masts stand better, are less liable to be carried away, because the strain is more divided. The sails, being in smaller sheets, wear much longer, and are less liable to being split; and in *calm* weather (so extolled by poets, but so annoying to sailors), the sails are not slatting against the masts nearly so much as larger sails. They are snugger when clewed up in a squall, easier to furl, and, when furled, less liable to be chafed and blown away. Another advantage is found in getting under way, head to wind, in a good whole sail breeze, when it may be very necessary to have the ship quickly under command, and yet not have so much sail at the masthead as to trip the anchor too soon. Beating through straits in squally weather, when you can gain only by carrying hard and watching sharp, how convenient to be able to reduce to double-reefs, and still carry on! I have several times been so situated, when, a sudden squall coming up, I have been compelled (rather than lie to, or undertake to reef in a squall in narrow waters) to bear up and lose ground in an hour which it had taken half a day to gain. Again, running for land or shoals to get a departure, as the Palawan passage and various parts of the China Sea, how much delay, risk, and anxiety, may be avoided by carrying on topgallant-sails with a fair wind, and even royals; knowing that, in case of making danger on the wrong bow, you can, in five minutes, haul on a wind and claw off under double-reefs and courses! How satisfactory, when running up channel, or for our coast, in thick weather,—with a falling barometer and increasing breeze, to be able to carry on nearly whole sail, and perhaps make the desired light or harbor, when any prudent man, with the old rig, should be under double-reefs, ready to haul off!—knowing, as you would, that you are always able to come under double-reefs with the watch, while your neighbor is calling all hands.

Again, for sounding; imagine yourself to be running for George's or the South Channel, and a thousand other places where the lead is often neglected, for the reason that you cant't heave to, without clewing down or reefing; with the rig I advocate, you can clew up or clew down topgallant sails, and get a sound with much less trouble. Again, in case of splitting sails, or, from any cause, being obliged to bend others, how easily it can be done, compared with the old rig, in which it is next to impossible to bend a topsail, when you could carry one double or close-reefed!

By omitting the cap-stay *on the main and mizzen-masts*, the topgallant sails can be set over the reefed topsails. I do not recommend omitting it from the fore mast, because the sail which hoists on the fore cap-stay is too valuable to be dispensed with. The foretopsail, when whole, being no larger than the main one, when reefed, and the masts being equally stout as on the main, it will seldom be necessary to reef it.

In the ship Massachusetts, coming from Liverpool, when I came in her as passenger, we had, one morning about nine o'clock, a sudden and severe squall: the ship had been under royals, jibs, and spanker, fore and main topmast studding sails, heading westerly; wind abeam on the larboard tack. About 8, A.M. squally; took in studding sails, royals (being topgallant sails of old rig), flying jib, and spanker; 8.30, took in mizzen-topgallant sail; at 9, while we were at breakfast, a sudden and dense blackness came over the before black atmosphere; the captain ran on deck, I followed instantly, and cast only one glance to windward to satisfy me that we were caught with too much canvas set. Before the order to haul up mainsail, or any other order, could be obeyed, the squall struck us: I got hold of the weather-wheel, and we just saved her from being struck aback; she fell off without losing headway, and, at the instant the sails filled, the squall was on her; the main-tack bolt parted, the mainyard flew up so suddenly acockbill as instantly to carry away the lee maintopsail sheet, and coming as a lever suddenly against the main-stay, drew out both the bolts from the bitts, thus bringing a great strain on the foremast by the upper main or "cap-stay, and on the stays higher up;" both forestay bolts were drawn out of the knightheads, and one bobstay carried away; at the same instant the ship was hove gunwale under, and the jib and inner jib, foretopsail and topgallantsail, and every thing forward excepting the foresail, were torn to tatters, although cotton canvas, and only a few weeks bent; the maintopgallant sheets parted, and this sail and the maintopsail, with lee sheet gone, got aback, and were saved only slightly damaged; also the mizzen-topsail and mainsail. For a few moments, while I assisted the man at the wheel to keep her "close at it," the ship seemed fairly to fly through the water. It soon moderated to a regular gale, with confused sea. By one or two o'clock, every sail was replaced, and all right — the ship under double-reefed topsails and foresail; that is to say, whole topsails of new rig, the spare foresail bent to the mainyard, the spare main-topgallant-sail for a foretopsail, and the spare foretopgallant-sail for a mizzentopsail. The foretopsail was entirely torn from the yard, and little of it left — *not a spar was injured in any way.* Every man on board of that ship, at that time, felt convinced, that, had such a squall struck any other ship with whole topsails of the old rig, she would have lost her topmasts at least; and, if the lower staybolts had drawn as they did, not a stick would have been saved. There never could have been a more awful and beautiful illustration of the value of the rig. I have often seen harder squalls, but never before was caught by such a one on a wind, with so much muslin spread, and without time to get it reduced. The studding sails, too, are more easily managed than in the old rig; the lower studding-sail can be carried longer, because the boom has not so large a topmast-studding sail to strain it.

The mizzenmast, being nearly as long as the main, gives a useful spanker, and an excellent support to the braces of the maintopsail and topgallantsail, &c. which go to it, excepting one part of the topsail brace, which comes on deck.

In fresh breezes, with all sail set, and when carrying studding sails, the braces can be more easily hauled in, for the reason that you have more levers. Three men applied to the maintopsail brace, and three to the topgallant brace, will haul the yards in easier, under these circumstances, and also in tacking, than six men could haul in the maintopsail brace in the old rig. All the booms, excepting the foretopmast-studding-sail boom, are lighter than usual in proportion to their length; also all the yards, excepting the lower yards. The topmasts, too, or topgallant-masts, may be much lighter than in the old rig, say one and a half inches in diameter for a ship of 750 tons. The objections to the rig, in my mind, vanish into insignificance, when compared by those who understand it, to the many striking advantages. I will now name the objections as generally made, at first sight, and at the same time candidly state how far I think they are justified by the experience of the Edith, Massachusetts, Samoset, and Reindeer.

Firstly, the increased cost. This is generally urged as the most serious objection; and, if the new rig is not an improvement, it certainly is an objection which should go far to condemn it; but I do not doubt that nine in ten seamen will admit the great advantages of the rig for stormy latitudes. If, then, this point is conceded, let me ask if any ship is constructed anywhere, for any trade, where she is not to be at some time subjected to squally, blowy weather? The Atlantic is certainly the most stormy ocean; but who that has been to China, Bombay, or Calcutta, would like to go unprovided with the best means for encountering gales, typhoons, or squalls? Who that has passed the Cape, going east or west, that would not, particularly from May to August inclusive, like to have the new rig? Who that has beat down the Bay of Bengal in the south-west monsoon — who that has left China from June 1st to October 1st — who that has beat up to Shangae from October 1st to April 1st — who that has doubled Cape Horn to get into the Pacific — who that has beat up the China Sea, against the monsoon, would not be glad to have the advantages which I have recited in detail? It is generally admitted, that ships for the India trade may have more canvas than for the European trade; but is there any one who will say that he would not like to be able easily and quickly to reduce his canvas? But, as to the cost, I have consulted the spar-makers who made the Samoset's spars: they say that, being a bark,* they made her spars at the same rate as they would have made them like the old rig, had she been a ship. They also say, that they estimate the additional expense as embraced in the extra length of lower masts, and in the value of the three topsail yards, and they call this extra cost $75. I estimate the extra blacksmith's bill at $50, and for extra cost of rigger's bill, say $50 more; add to these items more blocks, at a cost of $25, and we have the sum of $200. Now, if the advantages of the rig are not worth that sum in the first cost of a ship, they are not worth adopting.

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* Now a ship.

But the spar-maker has deducted nothing for the decreased diameter of yards and topmasts, and which I think nearly equal to the sum of $50.

Secondly. The next objection is to increased weight aloft: let us examine into the extent of this. The lower masts are longer by eight feet at the head; this is counterbalanced by the reduced weight of the masts above the lower masts; there is one more yard on each mast, the extra weight of which is partly made up by the reduced diameter of all except the lower yards, by the reduced weight of the topgallant sail, which represents the upper half of the old topsail, and by the fact that the topsail yards are always lower down. The booms are all lighter than in the old rig, excepting the foretopmast-studdingsail boom, so that the effect to heel the ship is not greater than in the old rig. These arguments are used only to meet the objections of those who prefer to be light aloft; and if all ships are constructed deep and narrow, and are cotton or tea-loaded, with little ballast, the objections are valid. But for iron-loaded ships, and ships with any other heavy cargo, a little additional weight aloft is, to say the least, no disadvantage. Most of the serious accidents which happen to ships at sea, in gales of wind, arise from being too laborsome, and from not being able to reduce and TO MAKE SAIL quickly. More damage to ships is done by their having too little than too much sail set. Considering, then, that the extra weight aloft is a disadvantage only to crank-ships, I ask if, in this class, it is not made up tenfold by having the power to reduce and MAKE SAIL quickly? For what is more uncomfortable than having to make and take in sail in a ship whose deck is generally at an angle of thirty degrees with the horizon?

The masts and yards are certainly better supported, both by stays, shrouds, and backstays; and, in case of carrying away a topmast (say, topgallant-mast), you are still under double-reefed topsails, and you can much more easily and safely get up a new mast with a doubling of twenty feet than with one only ten or twelve! The reader will notice that I hardly admit of the possibility of carrying away any thing below the lower cap, — and it is certainly difficult to carry away the lower mast-head by any strain that can be put upon it by the topsail which hoists on the heel of the topgallant masts. I do not say that it is not possible to meet with disaster to my rig, as in the case of the Reindeer, in a hurricane in the Pacific; but I do say that a ship with it is much less liable to lose her spars and sails, much less likely to come on the underwriters, and much more likely to command a choice of men to man her.

But the point where my rig commends itself most to the *interests* of shipowners and sailors is in the fact, that you can do nearly as much with the watch as the ordinary ship can do with all hands. Every man who has been to Batavia, China, Calcutta, and Manilla, knows that, on leaving those places, one third of the crew, on an average, is pulled down by dysentery, fever, and ague, and other diseases to which mariners are subject, from exposure to night-air, unwholesome drink, unripe fruits, and hard labor in stowing cargo; and it often happens, that, when the men are most reduced in strength, the time to sail is the season of gales and squalls; the ship that has my rig will then command confidence, and beat a superior sailer in getting into the trades. Capt. Hollis, of the Samoset, and Capt. Lord, of the Reindeer, assure me that they could take care of the ship in any weather without calling all hands. They sailed with a prejudice against the rig, but returned, after voyages round the world, quite satisfied with it: all they want is more canvas; for, they say, "with this rig, we can take care of more canvas with fewer men than in the old rig;" and they use this as an argument why a ship, rigged like the Samoset or the Reindeer, may have from ten to twenty per cent more canvas than any other. Their verdict, as well as that of Captains Wood, Goldsborough, Johnson, &c., is in favor of the new rig.

Thirdly. The next objection, and the only one that I lay the least stress upon, is, that the canvas being cut up into small pieces, cannot do as much good as if in larger sheets; that, having more yards, more ropes, more corners, more interruptions to the course of the wind along the sails, the ship cannot sail as fast as with the old rig.

Let us examine how much this *acknowledged objection* amounts to. As to "the gaps," the "cutting up of the sails," it must be remembered that the royal yard (topgallant of old rig) and the lower yard are in precisely the same places as they are in the old rig: the only additional gap for the escape of the wind is between the foot of the topgallantsails and the topsail yards. To obviate this, let the courses, or any two sails above, have a cloth more in them. Then, as to the increased corners, &c., there is a very small increase for the same reasons — and this objection only applies to "on a wind," — it is conceded that the sails can be more easily set and taken in, can be carried longer, and, when set, stand flatter than any others; the studdingsails can be set and taken in with more ease, and without yawing the ship off her course, — which operation, so much practised, should be prohibited by statute!

No other objections have ever been made, unless on account of the looks; this is not worth wasting a single argument upon.

Another word as to cost. That which is best in the long-run is the cheapest; and there is no more reason to expect the best canvas, the best patent steering apparatus, the best windlass, and the best rigging, without paying an extra price for them, than to expect the cheapest captain to make the best voyage for the owners. If one-half the advantages I claim are found to exist, and all the objections discussed be admitted, the new rig, at a cost of $200 or $300 extra, is of no consequence in a ship of 750 tons, costing $50,000. If I were an underwriter, I would take a risk on a ship fitted with the new rig certainly for a quarter, if not half, per cent less for the China passage, or at the same rate for two European passages in the winter season; and if I were a sailor, looking for a ship for a long voyage, I would give the preference to one with the new rig of a dollar per month at the least. The rig, which I call mine, is entirely original, so far as I know, with me. It is true I have seen a ship in Boston harbor with two yards and sails on an ordinary foretopmast, and that was something like mine; and there were several ships in the East India Seas fitted with similar sails and yards, but not arranged like mine, and having no symmetry, as I am told, for I have not seen them. Every man who has been in the British Channel and North Sea has seen schooners with a shoal topsail on the heel of the topmast, under the lower cap; but there the likeness to my rig ends. I have seen one eastern schooner with a topsail on the heel of the topmast, and a large unsightly topgallant sail above the cap, on the topmast; but it is not a likeness of my rig.

Naval officers have freely discussed my rig, some with an understanding eye, and others as if blindfolded. *All* admit its utility in heavy weather in a ship short-handed; and *most of them* repudiate it for men-of-war, because, as they contend, they have plenty of men to do the work, and they don't want any labor-saving "gimcracks." Why, in the name of common sense, then, do they lumber their ships with all sorts of contrivances for rigging out and rigging in, topping up and jumping down, jiggers for this and tackles for that? Why don't they dispense with sheaves and pins, capstan and stoppers, and do all by main strength?

Now, although a novice in war-ships, I do contend that the rig is specially appropriate for a man-of-war, and is most appropriate in war-time, particularly with the masts fidded abaft, because in battle the damages can be much more easily repaired, and the guns more constantly and easily worked, for the reason that more men can be spared to work them. And, whether in peace or war, the large sails of ships of the line would be much more durable and much more manageable. In this opinion I am sustained by one of the most intelligent seamen in the navy, Commander L. M. Goldsborough, who was attached for fifteen months to the Massachusetts. But, as economy of money and labor is not one of the objects of the navy, I shall say nothing to controvert the opinions of the many who advocate my rig as suitable only for half-manned merchant-ships. In the course of my voyage to Ireland in the Jamestown, in 1847, Capt. Macondray, who also made a passage to Liverpool in the Massachusetts, and myself, *only once* regretted that she was not rigged like the Massachusetts, and that was all the voyage. We had plenty of reefing to do; and we concurred in the opinion, that, had she been so fitted, our voyage, short as it was, might have been performed in less time, with much less labor.

It will be asked by some, why I am so desirous of recommending this peculiar rig to merchants and seamen: having no patent, and no desire for one, I can expect no pecuniary advantage. True; but I wish to introduce it for the reason that I believe it will go far to reduce the risk and labor and anxiety of sailors, and the losses of underwriters. I do not advocate it on selfish grounds, but, as I believe, because I think it will be for the general good, and that it will essentially mitigate the sufferings of that neglected class of men, the foremost "Jacks." I do not recommend it specially for large ships, though I believe that the larger the ship, the more convenient it will be found. It is well adapted to coasters of all sizes.

One word more on my rig.—In conversing with some gentlemen of the navy on this subject, with my sketch before them, I found it approved for several reasons, which are not stated in the foregoing remarks. They are as follow:—

In action, when it is often necessary to double-reef topsails, not on account of the strength of the wind, but because it is convenient to have the ship as upright as possible, in order to give the guns greater effect, my rig would be very handy to clap on more sail at once, and shoot into position; also, in case of damage to sails or spars, the repairs could be more readily made. The topsails may be disabled by shot, unbent and replaced by new ones, without lowering the topsail yards on the caps, as would be necessary in the old rig, whereby the topgallant-sails are rendered for the time useless. In short, I consider it a waste of words to endeavor to recommend it to those who cannot see its advantages after five minutes' inspection of the plan. I feel quite sure that every intelligent seaman will appreciate the rig, both for vessels of war and merchant-ships, and most particularly for whalers. It often happens, I believe, that nearly all the crew leave the whale-ship on the cry of whales in sight, "There she spouts," or words to that effect. All is confusion; "down boats," "clew up topgallant-sails," "up mainsail;" and away they go, leaving the ship with every thing in confusion, and only three or four men on board to bring matters into order. If the ship happen to have whole topsails set, these few men can't reef them, though they may "clew down," and with some effort take care of the ship: but they cannot make and take in sail handily; they cannot beat up for one boat, and bear away for another, with the same commanding canvas that they could with my rig. Suppose the ship to be under double-reefs of the old rig when the boats leave, the few men left on board cannot easily let them out and beat up to the boats, which very likely the one hundred-barrel sperm-whale may have towed several miles to windward of the ship; night is coming on, and the rich prize may be lost before the ship and whale can be secured. With my rig the few men remaining on board can clap on the topgallant-sails, and, if the wind admit, the royals, and beat to windward in one half the time and with half the labor that would have to be expended in the ship of the old rig.

I have said but little on the subject of rigging men-of-war and whalers after my plan, because I do not profess to be intimately acquainted with their wants. But the more I look into it, the more am I convinced that the rig must, *sooner or later, be introduced in all ships,* large or small.

I have to say, in conclusion, that I shall be happy to furnish plans of spars and sails to any who may wish to adopt the rig. I shall feel well compensated for the labor in the reflection that I have done something to lessen the hardships of sailors.

While on the subject of ships and their "fixings," I may as well add a few words on general matters.

Protection from Damage by Lightning. — On this subject I have published a pamphlet for gratuitous distribution, which can be had at 48, State-street. Since that publication, I have received a communication from the inventor, which will be found hereto attached. (See p. 41.)

Deck Houses. — This is a subject which has been much discussed among underwriters and merchants. I have generally held and expressed the opinion, that the most complete and safe arrangement for ships is to have a half-poop about as high as the main rail, descending three or four steps into the cabin. This gives an airy and comfortable cabin, and is particularly well adapted to East India and China traders. But for the European trade, for ships not regular packets, the best arrangement is to have the between-decks *entirely clear fore and aft*, giving a good chance for ventilation, and health to steerage passengers; the cabin to consist of a house only large enough to accommodate officers, and attached to or rising from a half-poop deck, under which, cabin stores, spare sails, and a water-closet, can be placed; the steering apparatus being placed abaft and uncovered. This gives a convenient space for the officer of the deck, and permits the man at the wheel to see the sails and the following sea. Forward should be placed a convenient house to accommodate the crew, the ship's galley, steerage-passenger galleys, cook and steward's sleeping apartments. But this arrangement is not well adapted to a ship with little beam and great depth of hold, and in the best modelled ship may occasionally be subject to damage by shipping a heavy sea; still I would prefer to take my chance of this, rather than to breathe the "malaria" created by two or three hundred steerage passengers. I would cite the Paul Jones, Saml. Russell, Vancouver, and many of the same class of ships, as having the perfection of accommodations for East Indiamen; the Samoset, as a good illustration of the European trader, designed to carry steerage passengers, — her dimensions being 150, 33, 21. There are many ships whose names I do not recollect with similar arrangements; but they have generally less beam and more depth.

Boats.— This subject, especially in ships carrying steerage passengers, is too much neglected. This class of ships, with deck-houses, cannot well carry a "long-boat," but should have, instead, one large and not heavy life-boat, and, at least, four smaller ones; two of which, for general use, to hang on the quarters, to be provided with an air-tight apparatus, for which vulcanized India-rubber canvas is the best; and two to be placed on the deck-house aft, which may be of metal, stowed at a proper distance from the binnacle. At a cost of $30 or $40, every boat can be furnished with India-rubber air-tight buoys, so as to make her a life-boat, and not much increase the weight. In Indiamen a good modelled long-boat is best with a sail and mast always ready, and two good quarter-boats made life-boats of as above recommended.

In regard to steerage-passenger ships, it seems hardly possible to have boats enough to carry all the people that the law allows them to take; for a ship of 750 tons, carrying, say two hundred with her crew at least, would have to be provided with eight boats, capable of carrying twenty-five souls each. I do not see how this can be managed without lumbering the ship too much, unless we provide several India-rubber boats, which can be done at a cost of $100 to $150 each, and, when not inflated, will occupy no more space than a portmanteau. I have seen an article well contrived for this purpose at the warehouse of the "Union India Rubber Company," 19, Nassau-street, New York, known as the "Stanton Life Boat," where another life-boat can be seen, invented by Mr. Starr, and known as "Starr's Air Boat." They should be generally adopted in steamers and packets. I say nothing of the large class packets, like the New World, the late Ocean Monarch, Henry Clay, Liverpool, and others, because they are nearly perfect in their arrangements so far as accommodations and models go; they only require *more boats*, *Harris's lightning conductors*, *Robin-*

son's steering gear, *Emerson's ventilators*, *Cartes' rocket apparatus*, and last, not least, *my rig*, to make them perfect in all respects. They are now superior to the ships of any other nation for the Liverpool trade. Still it is a libel on our ingenious shipwrights and merchants to say that they cannot be made more perfect: no one will deny this, although many will be slow to increase the already large cost.

Pumps. — The grain-carrying business has called the attention of every one to this all-important subject, and there have been more good pumps fitted within the last two or three years than ever before; there are so many good ones, that I am at a loss which to adopt as the model ship's pump. I have used in several ships the French pump, with conical box, all the gear being above deck; but a heavy lead pipe extending from the upper deck to the bottom, supported only at the between-decks, is liable to accident, and I think a stout copper pipe better. But, whatever pumps be used, they should be placed near some hatchway, where they can be readily got at; and the pump-well should *invariably* be large enough to admit a man when the pumps are shipped, and the well should be strong enough to resist the pressure of cargo. These precautions are often neglected; I might say, seldom attended to. The New World, and several other ships I have inspected, were properly fitted in this respect; and we owe to Capt. Skiddy's ingenuity the adoption of several improvements. Of my own ships I cannot say that one is properly contrived as regards the pump-well, excepting, perhaps, the Raduga and the Reindeer. Every ship should have a place to sound the pump-well, without interfering with the pumps. When building a ship, we are apt to be in a hurry, and often neglect these apparently little, though really important matters. We necessarily expend so much, that every thing not vitally important is omitted. As to the position of pumps, the one generally chosen is the worst, or nearly so, that can be selected; they are, in ninety-nine cases in the hundred, placed very near the mainmast. I can see my brother merchants and sailors prick up their ears, and ask, — Why should not a custom, sanctioned by many years' practice, be considered orthodox? I reply, because the mainmast is generally, almost always, the point of attraction for lightning, and the pumps are sure to suffer if the gear is allowed to remain in them during a stroke of lightning, especially if they be made of metal, and the men at the pumps are in more danger than if they were elsewhere; because, in cutting away a mainmast, or losing it by accident, the pumps, especially the old-fashioned wooden *logs*, are in danger of being broken and rendered useless; because, generally, the after-hatch is several feet from the pump-well, also the main hatch; and, in case of being obliged to hoist out the pumps, you cannot get at the well, even if the space be large enough to admit a man without breaking out cargo.

Again: ships generally trim a little by the stern, and the pumps had better be as near the centre, between the main and mizzen masts, as possible, or near the after-hatch; and I think a trunk or comin, two feet high, should come up above deck, if the pumps are not near a hatch, the trunk to be so contrived that a man can get down at all times. The Farewell, and a host of ships that we know of, besides many from which no one lives to tell the tale, would have stood a much better chance of being saved, had their pumps and pump-wells been properly contrived. It is certainly a convenience to put the pumps into the same "thick-work" around the mainmast; it makes a good finish, looks well, accommodates the capstan, the clank of the pump is farther from the passengers, and the captain's feet are kept drier! These are nearly all the advantages I know of derived from having the pumps at the mainmast. Do they counterbalance the disadvantages named?

Ground Tackle.—Cables are restricted by custom in our merchant-ships, generally, to ninety fathoms, and to two bowers; though there are many ships that have stream chains, and two bower anchors, a stream and kedge: this refers to well-appointed ships. Perhaps this is enough, excepting for Calcutta, where, I believe, it is either necessary to have a third bower, or sheet anchor, or to pay the pilot a certain number of rupees, equivalent to about half the value of a spare anchor!

Many ships have but two hawse pipes! This is a mistake which should be corrected in all ships, large or small, as a stream chain is certainly very convenient for fasts in port, and very necessary in the India trade to anchor in moderate weather on coral or other rocky bottoms, and should be large enough to pass for a third bower.

Chain lockers are an acknowledged nuisance, but I do not know how we can dispense with them. If the chains be put into the lower hold, they are unhandy to haul up, and subject to get jambed more easily than in the between-decks; if at the mainmast, you lose ten or twelve fathoms, and have to haul the chains along the deck, where the water-casks, &c. are stowed; if at the forecastle bulkhead (the same being under deck), they are at hand, very convenient; but, unless we enlarge the forecastle very much, they are too far forward for the ease of the ship. So I shall continue to consider that subject as open for discussion; having only to ask those who fit out ships to make the ends of their chains fast by a lashing, where it can always be got at, and to give a little more weight at least to one anchor; for it is a notorious fact that Yankee ships are avoided by all nations when at anchor in open harbors, for the reason that they go adrift on the least provocation. I speak more particularly in reference to ships trading to the East Indies and China, though I believe what I state is generally acknowledged to be a fact in all our ships.

We have much improved in windlasses, and can beat the world (whalers excepted) in heaving in chain. The best I have seen is a new invention by Mr. Andrews, which has the advantage of being able to heave in on any one part, or heave back on any one part, including the ends, while the other parts or barrels are in use; but this windlass has not yet come into fashion, and may require further test before confidence will be placed in it,—simplicity being a great desideratum in all these matters.

Copper.—Never expecting to see any more of the old-fashioned copper lasting five to seven years, I shall say but little on this head: it is a subject on which the most experienced seem to be at fault. Yellow metal, made at Taunton, appears to be getting into fashion, especially among our whalers, and in cool climates is generally approved of; but it will foul more or less, and in this respect it is certainly inferior to copper. Still the subject is one of which I cannot profess to have had any conclusive experience, and in this opinion I am generally supported by manufacturers themselves.

Canvas. — Cotton canvas for fore and aft sails, and for all the sails, excepting the mainsail, of my rig, is the best, particularly for the East India trade; for, while it lasts, it propels better than most other canvas: but for the European trade, where cold weather prevails more, some more pliable material is generally preferred. When the manufacture of cotton duck becomes more general and cheaper, it will undoubtedly take the place of all other canvas; though the sailors and the sailmakers prefer to handle several other kinds. Kyanized canvas has been partially used, but has not been generally approved, as it is said to weaken the fibre. This is in accordance with my experience, so far as I have tried it, in two or three vessels; kyanizing prevents mildew effectually, and may do very well for awnings, tents, and the like.

Rigging. — I will not undertake to advocate any particular kind of rope, where most of the rope in use is good enough; but I have a word to say on the manner of using it.

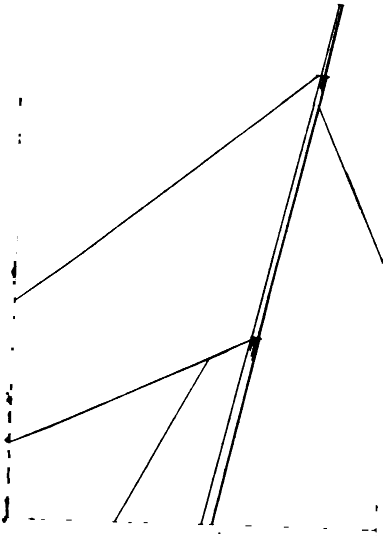
The Massachusetts, Samoset, Reindeer, and others have iron plates and bands, to which the lower rigging is attached at the mast-heads. They have had the experience of several years; and I have not only heard no complaint of this mode of fitting lower rigging, but I find it is much approved of. The ship Great Britain's rigging is also fitted to bands, but so clumsily done that I should condemn it if the rigging would answer to fit in the usual way.

The advantages of this mode, as applied by me, are, first, there is much less chance for slack rigging, less liability to rot the mast-heads and the rigging itself, less wear and tear and chafing; the rigging can be sent down easily at sea or in port, two shrouds at a time for repairs; the parts bear more equally than in the ordinary mode; and, lastly, the rigging looks snugger. The objection generally made to the plan is, "I don't like to trust to iron aloft;" which objection is met by the simple question,—Why is not iron as strong up there as at the lower end, where you trust to the dead eye strap, and chain plate of iron? It is true, that, if you carry away any, you necessarily derange two shrouds, instead of one; but the liability to carry any away is so much less, that this objection amounts to little. We put iron now in many places subject to violent and sudden strains with entire confidence, as bobstays, gammoning, trusses, pareils, &c.; why not the standing rigging? If it should be said, that, on account of lightning, the less iron aloft the better; and if this were true, then give up topsail sheets, ties, truss-bands, &c. &c. But I believe it is admitted, that the more metal about a ship, the less liable she is to being damaged by lightning. There are very few instances known of iron ships being struck, steamboats very seldom; buildings, with metal roofs, never damaged, provided the shock is conducted to the earth by spouts or other conductors.

DIMENSIONS FOR COASTING CRAFT.

Scale, 1-12 inch to foot; length, 100 feet; beam, 25; depth, 10.
Foremast, above rail, 44; head, 14.
Topmast, 14, 14, 12, 5; total, 45 — all in one.
Foreyard, 50; ends, 2½.
Topsail yard, 41; ends, 3.
Topgallant yard, 31½; ends, 2.
Royal yard, 22½; ends, 1¼.
Bowsprit, outboard, 14½.
Jib-boom, inside cap, 14; out, 13½; fly and pole, 14; = 41½.
Mainmast, above rail, 47½; head, 6.
Maintopmast, &c. all in one, 45½.
Mainboom, 53; end, 2; gaff, 28; end, 3.
Foreboom, 36; end, 1; gaff, 23; end, 1.

One reef in topsail and topgallantsail; one do. in inner jib, or bonnet; two do. in foresail and mainsail. A stout topmast-staysail, and a storm main-staysail, to carry when the boom-foresail is taken in, and when the mainsail is reefed.



THE NEW RIG

AS ADAPTED TO MEN-OF-WAR.

TABLE OF DIMENSIONS OF SHIP OF THE LINE.

			Feet.
Length over all, from stem to tafrilrail			228
Foremast, from stem		38	
Fore to main masts		82	
Main to mizzen masts		60	
Mizzenmast to tafrilrail		48	
		—	228
Mainmast, above hammock rail	88;	head,	32
Foremast, „ „ „	79;	„	29
Mizzenmast, „ „ „	80;	„	26½
Maintopmast	69½;	„	8½
Foretopmast	62;	„	7½
Mizzentopmast	56;	„	6
Bowsprit, outboard	58		
Jib-boom, outside cap	31		
Flying jib-boom	20;	end,	5
Mainyard	107;	„	5¼
Maintopsail and fore yards	93;	„	5½
Maintopgallant, foretopsail, and cross jack yards	79;	„	5
Mainroyal, foretopgallant, and mizzen-topsail yards	66;	„	4
Mainskysail, foreroyal, and mizzen-topgallant yards	52;	„	2
Mainmoonsail, foreskysail, and mizzen-royal yards	41;	„	1½
Foremoonsail and mizzen-skysail	33;	„	1¼

Spanker-boom, 63; end, 4; gaff, 44; end, 5½.

THE NEW RIG AS ADAPTED TO MEN-OF-WAR.

The importance of my rig to vessels of war, especially of the larger class, induces me to say a few words more on the subject. The sketch herewith, drawn on a scale of 1-16th of an inch to the foot, shows the adaptation of the rig to a ship of the line of 55 feet extreme beam, and about 228 feet in length, over all, from the outer part of the stem to the tafrilrail, being of the same beam as the U. S. line-of-battle ship Ohio, and about 20 feet longer, which extra length is placed before the foremast and abaft the mizzenmast in nearly equal parts; leaving the masts in the same relative positions towards each other as in that ship, and so far improving her model as to give finer ends, without in the least taking away from her buoyancy and stability. The table of dimensions shows, that the mainyard is 107 feet long, maintopsail yard 93, topgallant yard 79, royal yard 66, skysail yard 52, moonsail yard 41, and the foremoonsail and mizzen-skysail yards 33 feet.

The Ohio's mainyard is 107½ feet, and her maintopgallant yard is 52 feet against 66 feet of mainroyal yard of the new rig, which is in the same position as the topgallant yard of the old rig. These dimensions show a larger proportion of spread aloft than is usual in the ships of our navy, but not more than is usual in our merchant-ships in proportion to the lower yards; and no more than, I think, can be readily taken care of by the crew of a ship of war of the class indicated.

My principal object in the sketch now presented is to show how the spars and sails can be used, not only in different places on board the same ship, but on board of other vessels of different classes. For instance, the maintopsail yard, 93 feet long, is as long within two feet as the mainyard of the United States frigate Cumberland; the maintopgallant yard is 79 feet, or about the length of the mainyard of a large class sloop of war, like the Jamestown, Portsmouth, and Plymouth; the mainroyal yard, representing the maintopgallant yard of the old rig, is 66 feet, or about the length of the mainyard of a brig of war of 32 feet beam, and about 450 tons, —smaller than which, gun-brigs, if built at all, should never be. In this adaptation, it will be seen by inspection that the mainroyal yard of a large sloop of war (topgallant yard of old rig) is 41 feet, against the usual dimension of about 38 feet, which is the length of the Jamestown's maintopgallant yard, and about the length of a merchant-ship's maintopgallant yard, old rig, of about 700 tons.

Supposing all the line-of-battle ships, all the frigates, sloops, and brigs, were of about the same size in our navy, it will be perceived that all the square sails in this plan, and all the yards, excepting only the mainyard and mainsail, will exactly fit on board of all the vessels,—that is to say, a line-of-battle ship's sails, from the topsail yard upwards, are exactly adapted to a frigate, and from the topgallant yard upwards to a sloop of war, from the royal yards upwards to a brig,—or, in other words, the maintopgallant yard and mainroyal yard of the ship of the line are the same as the lower yard and topsail yard of a sloop of war; the line-of-battle ship's mainroyal yard, 66 feet long, is the mainyard of a brig, topsail yard of a sloop, topgallant yard of a frigate; while the skysail yard of a ship of the line, 52 feet long, is the royal yard (topgallant of old rig) of a frigate, topgallant yard of a sloop, topsail yard of a brig; and the moonsail yard of a line-of-battle ship, 41 feet long, is the skysail yard of the frigate, the royal yard of a sloop, topgallant yard of a brig; while the foremoonsail yard, 33 feet long, answers for the brig's royal yard. These various adaptations of sails and spars are exceedingly important; and, as the same relative differences exist between the main, fore, and mizzen masts of the plan presented as I have described in my merchant-ship rig, I cannot but believe that the plan would, if carried out in any navy, embody many important advantages over the present rig; among which may be named efficiency, economy, safety, convenience, and last, not least, great superiority over any other navy which did not adopt the plan. The naval arsenals and ships, instead of being encumbered with spare spars and sails for each vessel, and not adapted perfectly to any other vessel, need only be supplied with certain sails and spars, to be designated *by numbers*, beginning with the mainyard of a line-of-battle ship, No. 1, — and so on up to the foreskysail yard of a brig of war, which would be No. 9, — so that, by having sails and yards known from No. 1 to 9 only, we should have all the square sails of all classes of men-of-war, excluding only the courses, which must be designated in some other way, as the mainsail of ship of line 1½, foresail 2½, and so on down to the brig, the mainsail of which would be No. 4½, and the foresail 5½.

Besides the many advantages which I have endeavored to describe in my remarks on merchant-ships, and which are equally applicable to men-of-war, it appears to me that in war-time the advantages to be derived in chase and in action, in manœuvring in narrow waters, and especially in supplying partially crippled ships in arsenals or on foreign stations, and in squadrons at sea, are so apparent and important as in my mind to make all the difference between success and failure. The result of a battle, in which perhaps the fate of a state or a nation is involved, may turn on the smallest point, as a shift of wind, a sudden squall, one or more ships crippled and thrown out of line: my rig renders the ship less susceptible to these every-day casualties.

Many a good ship has escaped, and many a one been captured, after a long chase, where the smallest advantage in speed would have ensured defeat or safety. Imagine a ship with my rig chased in a strong breeze and squally weather by a superior enemy, both ships carrying all square sails below skysails (say below royals of the old rig; the enemy is gaining, wind on the quarter, a rain-squall shuts in the chase, every spar is strained to the utmost, the chase quickly clews up and furls her royals, clews down her topgallant sails, and hauls on a wind under sail equal to double-reefed topsails and courses; it clears up a little, the enemy hauls up too, she cannot bear her mainsail and whole topsails,—so she has to haul up her mainsail,—every rope yarn is strained to its utmost, she cannot carry her whole topsails, she clews down to reef,—in the meantime the chase has gained so far as to defy pursuit, and she escapes! Every one who has lived through a war can appreciate the advantages here illustrated.

As I have said before, the rig cannot *ensure* conquest in action; it cannot *ensure* safety under all circumstances of danger from the elements; but it does offer several chances of success, under all circumstances, not so easily secured by the old rig.

Suppose two frigates of equal force to be engaged in a good whole sail breeze, when the proper canvas to fight under would be double-reefed topsails, jib, and spanker, the courses in the brails, one ship being rigged in the old fashion and one in the new, a double-headed shot cuts off the leach of the maintopsail of the old rig; the sail is thereby not only rendered useless until a new one takes its place, which is a work of time and danger, but the men on the fore and mizzen-topsail yards, while letting out the reefs to make more sail, are for a time much exposed, and take away just so many from the guns. The ship with the new rig meets with the same damage; she immediately sets her topgallantsails from the deck, and maintains her position, or commands a new one, keeps up the battle with advantage, while she does not expose her men to the sharpshooters of the enemy; and, with very little labor comparatively, a new maintopsail, if required, can be bent. A slight accident of this sort often turns the result of an engagement. Again, in the one case, the topmast of the old rig is shot away, whereby the ship is practically disabled. In the new rig, in case of carrying away a topmast above the cap, she can still make use of the topsail which is hoisted under the cap; she can make sail equal to double-reefed topsails and courses, with all three of her topmasts shot away; and in stormy weather she can get up new topmasts, without materially interfering with the topsails and courses, while the ship with the old rig is rolling about in such a manner as to render getting up new topmasts a very difficult job. In war-time, after an action, it often happens that several ships in a fleet are lost for want of means to refit them quickly from the other ships, or they are taken in tow and carried into a foreign port to be refitted, after great delay and expense; whereas, if the fleet is fitted after my plan, the chance of being able effectively and cheaply to supply their wants is vastly increased. We cannot provide against all the casualties to which ships are exposed by losing lower masts, bowsprits, &c.; but we can make good many minor damages by adopting my plan of rig. This system of inter-convertibility may be carried out in a navy in many other ways, as having all tanks made to suit all ships; by having guns of similar calibre and dimensions, that is to say, only three or four sizes, which can be made heavier or lighter, according to their positions. But I am now getting upon ground that I know little about: I will therefore say no more on the subject of fitting vessels of war after my plan, but rest its merits on the verdict of the candid and unprejudiced sailor.

I cannot close these observations on the fittings of ships, without again recommending strongly the adoption of canvas floats, made perfectly tight by coatings of India-rubber, for ships' boats. These floats are placed on the outside of the boats, just low enough to be out of the way of the oars, and are about nine inches in diameter in the centre, tapering to the ends, which are lashed together at the stem and stern posts: the life-boat of the ship New World is so fitted. The objection generally made, "that the floats will not stand any sudden and violent pressure," seems not to be well founded, if we believe, as we must, the following statement of Capt. Knight: —

"Ship New World, New York, March 9, 1849.

"Geo. H. Penfield, Esq.

"Dear Sir, — In reply to yours of yesterday, I have to say, that last Friday, the bark Rose Standish, in attempting to go to sea without a steamer, took a sheer, and came stem on to our ship's stern, where the life-boat you furnished us was hanging at the davits. Her chain martingale stay struck the boat amidships, the India-rubber floats being inflated at the time. Of course, it was the floats, and not the wood part of the boat, that the chain stay struck; but so great was the force, that the ship did not stop, until the oak tafrilrail brought her up; the martingale having gone through the boat, driving her thwarts in on deck, and carrying away our iron stanchions and rail. Strange to say, the floats were not injured. The great inducement in my adopting Col. Stanton's boat at first was, for the fending properties of the floats, to prevent a boat smashing, while alongside of a wreck, or lowering in a gale of wind; and this accident, and that of the burning of the ship Ocean Monarch, has more than convinced me, that your boat has many truly valuable properties, not possessed by any other boat. There is no fear of such floats as you have furnished to our boat. (Signed) "E. Knight."

This plan is patented, I believe, by Col. Stanton, of the United States' army, and has been introduced into the eighteen surf-boats recently built under my orders, for the Massachusetts Humane Society. The floats are made by G. H. Penfield, No. 19, Nassau-street, New York. These floats are filled by bellows: the larger boats are supplied with end floats of triangular form, placed under a small deck at each end of the boats; so that, in case of shipping a sea, they can be easily baled out. It is also very difficult to capsize a boat so fitted. The outside floats answer also for fenders: they are secured to battens of wood, riveted carefully through the planking.

PROPELLERS.

PROPELLERS, with a larger quantity of canvas than is usual in regular steamers, are getting into fashion; and they are likely to be generally adopted for cargo-carrying vessels, for the reason that the machinery occupies less space; and, although they cannot be expected to make the passage to Europe quite as quickly as paddle-wheel steamers, they are undoubtedly more economical in their consumption of fuel, and, consequently, can carry more cargo at a cheaper rate.

I consider it a "fixed fact," that no ocean paddle-wheel steamer can make money without liberal government patronage, in the shape of mail contracts; but I believe that propeller steam-ships, properly rigged, can successfully compete with paddle-wheel steamers, although the latter may be assisted by such contracts, while the propeller is not.

I am assured by intelligent officers, who have been attached to the Massachusetts on the coasts of Oregon and California, that she could easily carry fuel enough for ten months' surveying duty; for it was not found necessary, on the coasts named, to steam more than one day in five; and, the consumption of fuel being in that ship about nine tons a day of bituminous coal, it follows that she would require only five hundred and forty tons for the time named, still leaving space for troops or light cargo, equal to two hundred and sixty tons.

I do not mean to say that it would be expedient to carry, on any voyage, ten months' fuel. I merely make this statement in order to show that a propeller may carry a much larger supply of fuel than a paddle-wheel steamer.

The sketch herewith given, of a rig for a propeller-ship with four masts, is intended to represent a ship with four masts; three of them having yards of the same dimensions, larger or smaller, according to the taste of the owner, and in due proportion to the beam of the ship, and to the trade for which she may be designed. For the North Atlantic such a ship should have smaller spars and more steam than a ship designed for the Pacific or for the South Atlantic trade. The yards on the two middle masts should be geared to swing together, with pendants for the intermediate connection, to be regulated by some convenient arrangement of tackles along the after-side of the forward set of yards; so that, when bracing in or bracing up, or swinging the yards in stays, the crew would have to man only one set of braces.

This is a novel idea, and at first sight may appear to seamen to be difficult to carry out in practice; but I cannot, after much reflection on the subject, see any appreciable difficulty in carrying it out, particularly as there are no courses on the two masts alluded to.

CORRESPONDENCE.

THE FOLLOWING, REFERRED TO ON PAGE 23, EXPLAINS ITSELF.

LIGHTNING CONDUCTORS FOR THE PROTECTION OF SHIPS.

To the Editor of the Boston Daily Advertiser.

DEAR SIR, — I have the pleasure to hand you herewith a letter signed by Sir W. S. Harris, the inventor of the conductors adopted in all the ships of her Britannic Majesty. It is the more necessary to give publicity to this communication, for the reason that several modifications of his plan have been suggested, and in several cases adopted, in this country, and which he considers not only of doubtful utility, but actually inviting the electric fluid to the interior of ships, without effectually carrying off the shock. I have a more detailed communication from Mr. Harris, in reply to an inquiry as to whether he would recommend his conductors to be let into the masts, as now done in the British navy, as far down as the truss-band, thence by tubes or plates running down the after-shrouds to the side of the ship as far down as the copper sheathing, of which modification of his original plan he himself speaks in his work, edited by Parker. In answer to that inquiry, he writes: — "I quite agree with you, that, *if we could avoid* all interference with the ship's hull, it would be a great point gained. Any kind of conductor, however, led along the rigging, is not so secure as a fixed conductor: besides, it interferes with the great principle I have been contending for, that is, bringing the whole mass of the vessel into a completely conducting state. Supposing we did lead (as I proposed in 1830) fixed conductors to the lower mast-heads, and then by the after-shrouds, over the side of the ship, I do not feel satisfied that would be secure *in all cases*, although I believe it would be generally so. Lightning will sometimes strike low down on the masts, perhaps ten or twelve feet below the tops. I think also that there is a *chance* of the lightning dividing between the conductors on the masts and the conductors on the shrouds and side of the ship; although that would not be *probable*, if the latter were large. If the system I have recommended, and which has been successfully practised so long in our navy, cannot be fully carried out, *certes* this is the next best plan; but the partial plans named by you, as recommended by Dr. Johnson, and adopted by others, cannot stand the working of the spars, nor the action of the fluid. It was not until after very great and repeated experience that we succeeded in applying my conductors (consisting of double-plates 1-16 and 1-8 of an inch in thickness) so as to stand the strain of the spars.

"I do not like copper-wire rope for conductors: its twisted surface is a bad electric conductor. I much prefer light copper tube, 3-4 of an inch in diameter and 1-16 thick; but, depend on it, nothing will be found so effective as the plan, in all its details, which I originally proposed, and which is now universally adopted in the navy of this country. The notion of *lateral* discharges by lightning conductors is *quite a delusion*, and now known to be so. The British Government pays virtually *nothing* for conductors at this moment, as all the ships are fitted. This would not be the case if wire rope or chains were used, they are so liable to be disjointed and lost like other movable ropes, and the cost of wire rope is 3*s.* 6*d.* sterling per lb.; my plates, 10*d.* to 1*s.* The Admiralty know from experience that real economy is on the side of my plan, besides the perfect security. Fancy three copper-wire rope, or chain, conductors in a ship, dangling about her rigging, to be constantly watched by sailors in all weathers,— every sailor knows what a nuisance this is."

The expense of fully carrying out Mr. Harris's plan in all merchant-ships will probably interfere with their general adoption; but our valuable packet-ships and our vessels of war should be so fitted. What consequence is the expenditure of a few hundred dollars for fixed and permanent conductors for effectually protecting such valuable interests in *property*, to say nothing of the *lives* of so many people? I have published, for gratuitous distribution, a pamphlet containing copious extracts from Mr. Harris's works, having no other motive so strong as the hope of serving the public interest and the cause of humanity.

I am authorized by Mr. Harris and his coadjutors to introduce his conductors in this country, and shall be happy to do so when occasion may present.

Very truly, your servant,

R. B. FORBES.

Boston, Jan. 14, 1849.

To the Editor of the Daily Advertiser.

SIR, — The following communication being of importance to ship-owners and the shipping interest generally, I trust you will be so good as to allow it to appear in your valuable and widely circulated journal. My method of permanently fixed lightning conductors for the better security of ships in thunder-storms having been *universally resorted to* in the British navy, and confirmed by full eighteen years' severe experience in all parts of the world, it has begun to find its way into other services, and is occasionally resorted to in merchant-ships. In some instances, however, my plan is very imperfectly applied; those professing to adopt it having considered that it may be varied with advantage, both as regards expense and in the method of applying the conductors.

It is not, certainly, my business to dictate to any gentleman, whether a ship-owner or commander of a ship, how he may best guard his property against the destructive effects of lightning. I am merely anxious to have it understood, that my plan, as now carried out in the royal navy of England, has been the result of at least twenty-five years' patient investigation and experience; and I do not believe any thing short of it will be found *perfectly secure* or available. Should, therefore, any casualty occur from lightning, in any vessel in which my plan has been imperfectly applied, such casualty must not be *thrown back upon me*, and the plan *called mine*. The perfect way in which ships of the British navy have come unharmed out of very tremendous discharges of lightning and thunder, and which have fallen with full and terrible explosions directly on their spars, is quite sufficient to show, that, if my system be faithfully carried out, no damage is likely to occur.

Hence I cannot be held responsible for what may be considered by others as improvements on the original plan, or indeed for any application of my system by persons not immediately known or authorized by me to carry out the mechanical details.

I remain, sir, your very obliged and faithful servant,

W. Snow Harris.

Plymouth, England, 20*th Dec.* 1848.

I cannot close this work without saying something more on the subject of lightning conductors.

The immense progress made, during the last two years, in merchant-ships, is very striking to one who has been comparatively out of the field. A vast amount of capital has been expended in elegant clipper-ships, costing from seventy to one hundred and twenty thousand dollars, and still larger sums in steamers for all parts of the world.

I am inclined to think that very few of these vessels are furnished with conductors; and that, of the few which have them, not one is fitted according to Sir W. S. Harris's plans. Some of the steamers sent to California, fitted out under the superintendence of that intelligent and accomplished seaman, Captain Skiddy, were *partially* fitted on a similar plan; but I am not aware of a single vessel out of the United States which has Harris's conductors fitted in strict conformity with his directions.

It is not just to him to introduce a part only of his plan, as any accident occurring to a ship partially protected would tend to throw discredit on it and create prejudice. If we adopt his system, it must be carried out in full, under proper authority.

I have recently resumed my correspondence with Sir W. S. Harris, and have his sanction to attempt the introduction of his conductors in the navy and in the mercantile marine of this country; and I shall leave no stone unturned to effect this most desirable object, and shall be happy at all times to give authentic information to those who require it, with a view to adopt the conductors. As to the expense, it is inconsiderable as compared to the cost of the class of vessels above alluded to; and, if we must be limited in the expenditure, it will be much better to leave out sufficient of the gilding and carving, pier-glasses and tinsel, to put in Harris's lightning conductors. This will, I am sure, be most grateful to passengers as well as underwriters.

I submit the following information, as bearing on this important subject: —

"PROTECTION OF SHIPS AND BUILDINGS FROM THE DESTRUCTIVE AGENCY OF LIGHTNING.

"The many instances in which ships of the royal navy have been preserved from the terrific lightning-storms of tropical and other climates by Harris's permanently-fixed and capacious system of metallic conductors, now universally adopted into the public service, has induced Mr. J. W. Gray, with the consent of the inventor, to undertake the application of similar lightning conductors in large merchant and other ships, which, laden with rich cargoes, or otherwise employed on important services, are destined to traverse latitudes in which the destructive agency of lightning is most to be dreaded.

"Mr. Gray, having furnished himself with the requisite means, and made himself fully acquainted with the mechanical details of this important invention, undertakes to fit the conductors in the most perfect way, and upon precisely the same system as that in her majesty's dockyards; and he begs to state, that he is the only person authorized by the inventor to carry out the plan, and that the inventor will not consider himself responsible for the success of his plan as frequently and imperfectly carried out by other persons, and not under his own directions.

"The great and awful destruction by lightning, found to have occurred upon a run of years in the merchant navy, has long been a matter of deep regret to the shipping interest: within a comparatively short period, no less than ten ships, the value of which, together with their cargoes, cannot be estimated at a total amount less than half a million of money, are known to have been completely destroyed in consequence of having been struck by lightning. The Bayfield, of Liverpool, for example, was burnt by lightning in 1845; and a large American liner, the Thomas Cope, destroyed in a similar way in 1847. The number of merchant-ships severely damaged, and either wholly or partially wrecked, is beyond all belief. It was only in July last, 1849, that a large ship out of Glåsgow, the Flora Muir, was so dealt with by lightning at sea that the ship had a narrow escape of foundering.

"Now it is a matter of history and officially recorded fact, that whilst much of this destruction has been going on in the merchant navy, in spite of the common and imperfect means recommended as an adequate defence, that ships of the royal navy have continued to receive a perfect and most remarkable amount of security against the terrible agency of lightning, so that ship after ship has come unscathed out of the dreadful thunder-storms of every climate, and damage by lightning in the public naval service is never found to occur.

"The advantages of Harris's conductors are, that they form an integral part of the ship and masts, and are, consequently, always in place, always ready to meet the most unexpected danger; they are not partially applied, and dependent on the crew of the ship for their regular and accurate application; but they defend the vessel on a large general system, without officers or crew having any thing to do with the matter, or liable (as in the common conductors) to the least inconvenience or injury by handling, fixing, or replacing them in tempestuous weather or in thunder-storms. They are quite clear of the standing and running rigging, and not exposed to damage or derangement from the many violent mechanical forces incidental to the ship's rigging.

"Mr. Gray undertakes to fit and supply these conductors, now admitted to be the only effectual security from lightning, on reasonable terms; and begs to remark, that, on the application of such conductors, the owners of the ship receive in copper, which has always a marketable value, a large proportion of the first outlay, and to which all future expense is limited, since the same conducting plates may be transferred or reproduced at a small cost for all future service.

"Mr. Gray supplies capacious conductors on Harris's principle for churches and other public buildings, and takes this opportunity of stating, for the information of gentlemen and others, either possessing large and beautiful mansions, or interested in the welfare of public buildings, that he is prepared to furnish and fix substantial and capacious lightning conductors for the preservation of such buildings from lightning, on the principles laid down by Sir W. S. Harris, and which have proved so generally efficacious in their operation. It appears by the public prints that her majesty's residence in the Isle of Wight was completely saved from the destructive effects of lightning in a severe thunder-storm in the spring of last year by this system of lightning conductors; whilst other buildings, and one or two vessels in its vicinity, suffered considerably. The amount of damage by lightning to buildings in this country is now ascertained to be of very serious amount, and such as to demand the utmost attention. A writer in Nicholson's Journal of Science estimates the amount at £50,000 annually. Not a year passes without record of some public or private building being struck or damaged by lightning; in many cases, set on fire or destroyed.

"*London*, 1*st January*, 1850."

EXTRACT FROM A LETTER OF SIR W. S. HARRIS TO THE EARL OF WILTON.

"Between March, 1846, and July, 1847, at least eight ships were known to have been saved in the destructive thunder-storms of foreign climates, including four large frigates. These are—

America	50	Jan. 1847	Corunna.
Constance	50	July, 1847	Coast of Mexico.
Fox	42	April, 1847	Colombo, East Indies.
Dido	18	May, 1847	Straits of Sunda.
Fisgard	42	Sept. 1846	In the Oregon.
Albatross	16	Jan. 1847	Coast of Africa.
Conway	28	March, 1846	Mauritius.
Racer	16	Jan. 1847	South America.

I have reason to believe that several other vessels were protected effectually within this period: for the above, however, we have substantial records.

"We can only calculate the saving effected on these ships, by comparing the damage done, under similar circumstances, in former times, to ships of the same class. Thus we have the case of the Phaeton, I have before mentioned, crippled and sent home with a jury foremast, from Gibraltar, in September, 1824, as being perfectly analogous with the case of the Fisgard, saved from a tremendous stroke of lightning in the Oregon, in September, 1846. We have the case of the Queen, 98, struck by lightning at Messina, in March, 1815, by which the ship was disabled and lost her mainmast, as a similar case with that of the Constance, of 50 guns, one of our modern heavy frigates, carrying nearly the same size masts, protected from a similar stroke of lightning, on the coast of Mexico, in July, 1847, and so on.

"If comparisons be made in this way, I feel assured, that I am greatly underrating the expense when I say that £10,000 would not have covered the loss to the country, had these eight ships been crippled by lightning, as common in former years. I leave any candid person, having knowledge of naval affairs, to say what would have been the loss, had such a frigate as the Constance lost her mainmast on the coast of Mexico, and been crippled perhaps on her foremast, taking into account the detention and refit of the ship, damaged rigging, &c. &c. However, let us take the loss upon these eight vessels at £10,000, supposing they had been damaged as in former years; and let us now see what has been the cost to the country in rendering them secure from lightning for sixteen years, by my system of conductors.

"Now it appears by a return given at page 13 of the Parliamentary Report,* that, including the difference of the market value of old and new material, and charging the full amount against my conductors, which should not be done, seeing that the copper is reconvertible at about four-fifths of a penny per lb., the cost to the crown would be, for

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* Shipwreck by Lightning.

A third-rate	£111
A fifth-rate	93
Sloops	51
Brigs	44

According to this, the cost of these ships would be as follow: —

Two 50-gun frigates	£222
Two 42-gun frigates	186
Two sloops	102
Two brigs	88
	£598

So that £600 would cover the cost to the crown upon these eight ships, and they are made secure for sixteen years. In return the country has saved £10,000, and, what is still of infinitely greater moment, the service of the ships on foreign stations; and that is on the supposition that such a casualty occurred only once in sixteen years, which is highly improbable: indeed, we have known that several ships have been damaged three or four times within such a period. Thus the Conway and Racer, two of these vessels, were struck twice within less than five years. It will be proved by the log of H. M. ship Cumberland, of 74 guns, that, between the years 1810 and 1812, the ship was three times struck by lightning, within which time she had three refits and two new mainmasts, and was set on fire and obliged to leave her station. It would be difficult to state what has been the actual amount of loss to the country in consequence of damage done in the royal navy by lightning, inasmuch as neither the total number of cases nor the real cost can be traced: it must, however, have been in the last war something enormous, and in the subsequent peace very considerable. We have to take into the account, as specified by the commissioners, the cost of large spars and made masts, often sent to foreign stations; the laying up the ships for refit; the rigging destroyed, &c. &c.; items extremely well known to those under whose immediate eye such expenses fall. The many intelligent officers in command of our dockyards, experienced officers of the navy, and the shipwright officers, very well know and can appreciate such expenses. Some idea, perhaps, may be given of the total cost, *in material alone*, by taking 133 cases, which occurred between the years 1793 and 1816, that is, in about twenty-three years, the particulars of which have been ascertained. Taking into account the rigging destroyed, and the general expenses of refit, then the following table will be found to represent the amount of damage upon a very low scale after every allowance, for the period specified: —

"*Amount of Damage upon one hundred and thirty-three cases of Her Majesty's Ships struck by Lightning.*

SHIPS OF THE LINE	38 lower masts (two-thirds of the whole ruined)	£38,000
	51 topmasts	12,500
	45 topgallant masts	900
FRIGATES	28 lower masts (two-thirds of the whole ruined)	14,000
	45 topmasts	4,500
	35 topgallant masts	350
SLOOPS, &c.	10 lower masts	1,000
	16 topmasts and topgallant masts . . .	700
		71,900*"

"Here is £72,000, nearly, upon 133 cases only. Hence, the total loss to the treasury, when every item of expense is included, must necessarily be very great, to say nothing of the services of the ships.

"* In this estimate, the values are taken upon the contract prices for spars, the cost of made masts, &c. in the late war; and all expenses are included."

STANTON LIFE-BOAT.

The following statement will show the operations of the Massachusetts Humane Society for saving life, and relieving those exposed by shipwreck. The Stanton Life-boat being the most approved now known, has been adopted, it will be seen, by the Society.

TO MARINERS.

At a meeting of the Trustees of the Massachusetts Humane Society on the 13th instant, it was voted, That a statement of locations of the life-boats and rockets of the Society be distributed, in the form of a circular, for the information of navigators.

Wherefore, the undersigned give notice that the old boats of the Society are stationed as follows: —

Edgartown, Martha's Vineyard	**one boat**
Nantucket, near Tuckernuck	**one „**
Chatham, near the Lights	**one „**
Nauset Beach, Eastham	**one „**
Between Highland Light, Cape Cod, and Race Point	**three „**
Plymouth, north of the town	**one „**
Scituate, inside the harbor	**one „**
Cohasset, do. do.	**one „**
Nantasket Beach and Hull	**two „**
Lynn, near Swampscut	**one „**
Marblehead Harbor	**one „**
Gloucester Harbor	**one „**
Rockport, formerly Sandy Bay	**one „**
Annisquam	**one „**
Plum Island, under the care of, and belonging to, the Merrimac Humane Society	**one „**

TOTAL, EIGHTEEN BOATS.

There have been located, very recently, eighteen other boats, called No. 1, twenty-four feet long; No. 2, twenty and twenty-one feet long; No. 3, fifteen and sixteen feet long — which are fitted after the plan of Colonel Stanton, with India-rubber canvas floats, furnished by G. H. Penfield, and made by the Union Rubber Company; the depot of which is No. 19, Nassau-street, New York.

They are located at —

Nahant, No. 1	one boat
Cut River, Marshfield, No. 1	one ,,
Point Alderton, No. 2	one ,,
Cohasset, No. 2	one ,,
Scituate Neck, south of Minot's, No. 2	one ,,
Chatham, near the Lights, No. 2	one ,,
Monomoy Point, near the Light, No. 2	one ,,
Cuttihunk, near the Light, No. 2	one ,,
Gay Head, near the Light, No. 2	one ,,
Plymouth, south of the town, No. 2	one ,,
Deer Island, Boston Harbor, No. 3	one ,,
Boston Light, No. 3	one ,,
Swampscut, Lynn, No. 3	one ,,
Ipswich, near the Light, No. 3	one ,,
Marblehead, No. 3	one ,,
Scituate Harbor, No. 3	one ,,
Cuttihunk, near the other boat, No. 3	one ,,
Duxbury, at Powder Point, No. 3	one ,,

Rockets for throwing a line to wrecks, so as to establish a communication whereby a boat may be more safely hauled through the surf, are stationed at Boston Light — at Point Alderton — Scituate Neck, south of Minot's Ledge — Ipswich Light — Highland Light, Cape Cod — and Chatham.

Three other boats are being built, under an appropriation by the State, for Plum Island, — one to be under the care of the Merrimac Humane Society; one at Race Point, Cape Cod; and one at Wellfleet, near to Newcomb's Hollow, for the Massachusetts Humane Society. Life-preservers for all the crews are to be furnished from the same appropriation, so as to insure safety, when boarding wrecks from the exposed beaches.

The undersigned applied to the Secretary of the Treasury to give orders to the revenue cutters to protect the property of the Humane Societies, and to afford facilities for inspecting their boats and houses on the coast, and to make experiments, &c. In answer, the Secretary writes : —

"In so far as the aid of the revenue vessels, when employed in the duties specially assigned to them by the ninety-ninth section of the Act of March second, 1799, may be useful in promoting the objects of the Society, the department cheerfully assents to your request. Of this the collectors at Boston and Newport have been informed."

The Committee earnestly recommend those who may be cast on the exposed beaches not to attempt to leave the ship until low water, as many lives have been sacrificed by too hastily attempting to land on a rising tide.

R. B. FORBES,
DAVID SEARS,
SAMUEL AUSTIN,
Committee of the Massachusetts Humane Society.

Boston, April 24, 1849.

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